INDEX* TO VOLUME IV.

A

Abich, H., work on hail in the Caucassus, noticed, 79.
Academy Nat. Sci. Philadelphia, Proceedings, noticed, 157.
Adger, J. B., analysis of talc, 419.
Agassiz, L., glacial action in Fuegia and Patagonia, 135.
Coal of Lota, 143.
Alcohol, an aldehyd, 132.
Allman, Graptolites, 142.
Association, American, Dubuque meeting, 327; Gray's address before, 282; notice of place of meeting, 159.
British, notice of meeting, 332.
Astronomical engravings, noticed, 243.
observations, Edinburgh, noticed, 156.
Aurora Australis, 243, 326.
Aurora Borealis of Feb., 156, 158.
spectrum of, 487.
Austin, C. F., Musci Appalachiani, noticed, 76.

B

Baeyer, phenol-colors, 62.
Baird, S. F., birds of North America, noticed, 242.
Baker, Mt., height of, 156.
Barker, G. F., chemical abstracts, 61, 310.
Barrande, J., notice of works of, and on origin of Paleozoic species, 180.
Becquerel, light emitted by phosphorescent compounds of uranium, 486.
Billings, E., fossils in the Eolian limestone of West Rutland, 133.
rejoinder to Prof. Hall's reply, 399.
Birt, change of lunar objects, 326.
Blake, diatomes in hot springs, 148.
Blood, iron in, 78.
Bloxam, C. L., chemistry, noticed, 496.
Bond, W. C., observation of solar spots, noticed, 242.
Boston Soc. Nat. Hist., memoirs, noticed, 242.
Botanical intelligence, 420.
notices, *Gray*, 72, 149, 420, 489.
publications noticed, 420.
Botany—
Brown, R., first botanical paper, 149.
Diatomes in hot springs, 148.
Erysiphei of the U. S., 151.
Herbarium of Dr. Curtis, 422.
Martius, Flora Brasiliensis. 151, 421.
Botany—
Lichens, Tuckerman's arrangement of, 420.
Micheli, researches in vegetable physiology, 72.
Musci Appalachiani, 76.
Pyrus, Decaisne's monograph, 489.
Seedlings, growth in, *Draper*, 392.
Sequoia, its history, *Gray*, 282.
See further under Geology.
Boussingault, iron in the blood, 78.
Bradley, F. H., new land snails from the Coal-measures, 87.
Quebec formation in Idaho, 133.
Quebec and Carboniferous rocks in the Teton range, 230.
notice of some of the works of J. Barrande, 180.
Brooks, T. B., Lower Silurian rocks in St. Lawrence Co., N. Y., 22.
Bouchardat, new organic base from dulcite, 313.
Bourgoin, water not an electrolyte, 310.
Bows, prismatic, on Lake Geneva, 79.
Buff, heat of expansion of solids, 488.

C

Carbon, specific heat of, 228.
Cave, bone, in Bavaria, 69.
Ceria, separation from zirconia and iron, 230.
Chloral, formation of, 312.
Clive, ammoniacal platinum bases, 226.
Cleve, P. T., geology of the northeastern West India Is., noticed, 234.
Coan T., eruption of Mauna Loa, 406.
Cold, effects of exposure to, *Draper*, 445.
Collodion film, stability of, *Rutherfurd*, 430.
Comets, Zöllner's views, 324.
Cope, E. D., intelligence in monkeys, 147.
curious habit of snake, 148.
Bathmodon radians, 238.
Wyoming coal formation, 489.
Croll, J., what determines molecular motion of, 229.

D

Dana, E. S., Datolite from Bergen Hill, N. J., 16.
crystal of andalusite from Delaware Co., Pa., 473.
Dana, J. D., coral island subsidence, 31.
notice of address of Prof. T. S. Hunt before the Amer. Assoc., 97.

* The Index contains the general heads, Botany, Geology, Mineralogy, Zoology, and under each the titles of Articles referring thereto are collected.

Dana, J. D., rate of growth of coral reefs, 143.
quartzite, limestone and associated rocks of Great Barrington, Mass., 362, 450.
Davenport, R. W., chemical investigation of malleable iron, 270.
Davidson, glaciers of the Pacific coast, 156.
Dawson, J. W., Eozoon, 65.
Decaisne, monograph of Pyrus, noticed, 489.
Delesse and Lapparent, Revue de Géologie, noticed, 145.
Dewar, J., chemical efficiency of sunlight, 401.
Dittmar, reduction of glutanic acid by iodhydric acid, 131.
Draper, J. C., heat produced in the body and effects of exposure to cold, 445.
evolution of structure in seedlings, 392.
Draper, J. W., distribution of heat in the spectrum, 161.

E

Earthquake, Owen's Valley, 316.
Earthquakes, recent, *Rockwood*, 1.
Edwards, A. Milne, fossil birds, 138.
Electricity, discharge of Leyden jar, *Rood*, 249, 371.
new galvanic pile, 405.
Elevation, see *Height*.
Ericsson, J., temperature of the surface of the sun, 151.
Erratum, *Mayer*, 264.
Ettingshausen, C. d', chestnut tree in the Tertiary, 79.
Euclid's doctrine of parallels, 333.

F

Fatty series, nitro-compounds of, 131.
Flames, gas, electrical condition of, *Trowbridge*, 4.
manometric, *König*, 481.
Frazer, P., Jr., efflorescent salt from Colorado, 242.

G

Gabb, Aurora of Feb. 4, 156.
Gaiffe, new galvanic pile, 405.
Galloway, R., manual of qualitative analysis, noticed, 248.
Geikie, J., change of climate during the glacial epoch, 231.
Geological Report of Canada, noticed, 145.
Hayden's, 238.
Louisiana, 136.
New Hampshire, 417.
Geological survey of India, memoirs, noticed, 145.
GEOLOGY—
Bahamas, *Nelson*, 318.
Bathmodon radians, *Cope*, 238.
Bermudas, observations in, *Jones*, 414.
Birds, fossil, *Marsh*, 256, 344.
Milne-Edwards, 138.
Cambrian and Silurian, history of the names, 416.
Carnivores, new genus of, *Marsh*, 406.
Coal formation of Wyoming, 489.
Coal-measures, correlation of, 413.
land snails from, *Bradley*, 87.
Coal of Lota, *Agassiz*, 143.
Coral island subsidence, *Dana*, 31.
Corundum region of North Carolina and Georgia, *Shepard*, 109, 175.
Crustacea, fossil, Merostomata, 322.
Dana's criticisms, *Hunt*, 41.
Eolian limestone fossils in, *Billings*, 133.
Eozoon, *Dawson*, 65.
Features of the earth's surface, formation of, *Le Conte*, 345, 460.
Graptolites, *Allman*, 142.
Hunt's address before Amer. Assoc., *Dana*, 97.
Man, fossil, in Italy, 241.
Mammals, fossil, *Leidy*, 239.
Marsh, 122, 142, 202, 322, 323, 343, 405.
Ohio, northeastern, 321.
Paleozoic species, origin of, *Barrande*, 180.
Plants, Devonian and Lower Carboniferous, 236.
Post-glacial period, *Reade*, 241.
Quadrumana in the Eocene, *Marsh*, 405.
Quartzite, limestone, etc., of Great Barrington, Mass., *Dana*, 362, 450.
Quebec and Carboniferous rocks in the Teton range, *Bradley*, 230.
Quebec formation in Idaho, 133.
Reptile, new, Cretaceous, *Marsh*, 406.
Reptiles, Tertiary, *Marsh*, 298.
Rhinosaurus, note on, *Marsh*, 147.
Silurian fossils, *Meek*, 274.
Lower, in St. Lawrence Co., N. Y., *Brooks*, 22.
Southwest, *Hilgard*, 265.
Tertiary basin of Marañon, *Hartt*, 53.
Tertiary, chestnut tree in, 79.
Vertebrates, fossil, from the Niobrara and Upper Missouri, 142.
West India Is., the northwestern, 234.
Gernez, absorption spectra of vapors of selenium, etc., 59.
Gervais, P., Zoölogie et Paléontologie générales, noticed, 77.
Gibbs, W., chemical abstracts, 59, 129, 226, 486.

Glacial action in Fuegia and Patagonia, *Agassiz*, 135.
epoch, change of climate during, *Geikie*, 231.
phenomena near New York city, *Stevens*, 88.
Glacier of the Rhone, 135.
Glaciers of Justedal, *de Seue*, 134.
of the Pacific coast, 156.
Glutanic acid, reduction by iodhydric, 131.
Gorceix, composition of vapors from Vesuvius, 147.
Gore, G., fluoride of silver, 60.
Gould B. A., letter from, 475.
Gray, A., botanical notices, 72, 149, 420, 489.
address before the American Association, 282.
How plants behave, noticed, 77.

H

Hail in the Caucasus, work of Abich on, 79.
Hall, J., reply to a "note on a question of priority," 105.
fossils from Falls of the Ohio, noticed, 72.
descriptions of fossils, noticed, 143.
fossils from the Devonian of Iowa, noticed, 241.
Harger, O., descriptions of new North American Myriapods, 117.
Hartt, C. F., Tertiary basin of the Marañon, 53.
Hayden, exploring expedition, 133, 158, 313, 424.
Hayes, A. A., red oxide of zinc of New Jersey, 191.
Heat of expansion of solids, 488.
method of tracing wave of conducted, *Mayer*, 37.
produced in the body, *Draper*, 445.
Heer, Devonian and Lower Carboniferous plants, noticed, 236.
Heights, list of, west of the Mississippi, 246.
Hilgard, E. W., some points in the geology of the Southwest, 265.
soil analyses and their utility, 434.
Hind, H. Y., report on mining district, noticed, 497.
Hitchcock, C. H., geological report, noticed, 417.
Holden, E. S., spectrum of the aurora, 423, of lightning, 474.
Holman, D. S., life slide for microscope, 324.
Hooker, J. D., flora of India, noticed, 420.
Hughes, T. McK., sharks' teeth of the Crag supposed to have been bored by man, 241.
Hunt, T. S., remarks on the late criticisms of Prof. Dana, 41.
history of the names Cambrian and Silurian, noticed, 416.
Hyatt, A., embryology of fossil Cephalopods, noticed, 242.

I

Inuline, Prantl on, 150.
Iodine, light emitted by the vapor of, 59.
Iron in the blood, 78.
Iron, malleable, *Davenport*, 270.

J

Jackson, C. T., analysis of meteoric iron, 495.
Jones, M., observations in the Bermudas, 414.
Jupiter, color of bands, 327.

K

Kau-sun, 151.
Kenngott, sterlingite and rœpperite, 146.
Ketones, fixing the constitutions of acids and alcohols by oxidation of their, 61.
Keutgen Jr., C., temperature and rain-fall for July at Staten I., 248.
Kirkwood, D., meteors of April 30th, May 1st, 52.
certain relations between the mean motions of the perihelia of the four outer planets, 225, 327.
König, R., manometric flames, 481.
Koninck and *Davreux*, damouritic schist, 238.

L

Langley, S. P., theft from Allegheny Observatory, 327.
Alleghany system of electric time signals, 377.
Lea, I., Rectification of Conrad's Synopsis of the Naiades, noticed, 77.
Le Conte, J., theory of formation of the great features of the earth's surface, 345, 460.
Leeds, aventurine orthoclase, 433.
Leidy, J., fossil vertebrates from the Niobrara and Upper Missouri, 142.
extinct mammals from Wyoming, 142, 239.
Lesquereux, botanical report, noticed, 494.
Lightning, spectrum of, *Holden*, 474.
Louisiana, report of State University, noticed, 136.
Lyceum Nat. Hist., Proceedings, noticed, 237.
Lyman, C. S., August meteors, 244.

M

Mallet, J. W., native sulphuric acid, 418.
fichtelite in recent pine timber, 419.
Mallet, R., volcanic energy, 409.
Marvine, A. P., petroleum in San Domingo, 158.
Marsh, O. C., descriptions of new Tertiary mammals, pt. I, 122; pt. II, 202.
note on Rhinosaurus, 147.
new Tertiary and Post-Tertiary birds, 256.
descriptions of new Tertiary reptiles, part I, 298.
Tinoceras anceps, 322.
new species of Tinoceras, 323.
remarkable fossil mammals, 343.
new and remarkable fossil bird, 344.
Quadrumana in the Eocene of Wyoming, 405.
new genus of Carnivores, 406.
new reptile from the Cretaceous, 406.
Masters, M. T., Botany for Beginners, noticed, 75.
Mayer, A. M., method of tracing a wave of conducted heat, 37.
on Radau's paper on the influence of a motion of translation of a sounding body on the pitch of the sound, 198.
erratum of the errata, 264.
measuring phases of vibration in air surrounding a sounding body, etc., 387.
method of measuring wave-lengths and velocities of sound in gases, and on an acoustic pyrometer, 425.
Mayer and *Stüber*, nitro-compounds of the fatty series, 131.
Meek, F. B., descriptions of Silurian fossils from Ohio, 274.
Cretaceous age of Rocky Mt. coal, 489.
Meteoric iron, analysis of, *Jackson*, 495.
Meteorite of Ibbenbühren, 78.
Meteorites of India, 78.
Meteorology of Staten I., *Keutgen, Jr.*, 248.
Meteors, April 30th—May 1st, *Kirkwood*, 52.
August, *Lyman*, 244.
Micheli, M., researches in vegetable physiology, 72.
microscope, life slide, 323.
MINERALS—
Andalusite, crystal, *Dana*, 473.
Bartholomite, 236.
Corundum in North Carolina and Georgia, *Shepard*, 109, 175.
Cryptomorphite from Nevada, 146.
Damourite, 238.
Datolite from Bergen Hill, N. J., *Dana*, 16.
MINERALS—
Fichtelite, *Mallet*, 419.
Garnet, transparent, from Silesia, 147.
Hisingerite, 75.
Leucite, 419.
Oligoclase from Wilmington, Del., 146.
Orthoclase, aventurine, *Leeds*, 433.
Salt, efflorescent, 242.
Serpentine, pseudomorphs, 71.
Stirlingite, 146.
Sulphuric acid, native, 418.
Talc, analysis, *Adger*, 419.
Rœpperite, 146.
Rosanite, 236.
Zeunerite, 146.
Zinc, red oxide of, of New Jersey, *Hayes*, 191.
Mixter, W. G., estimation of sulphur in coal and organic compounds, 90.
Moon, change of objects on, 326.
Motion, molecular, *Croll*, 229.
Morse, E. S., oviducts and embryology of Terebratulina, 262.

N

Nelson. R. J., Bahamas, 318.
Nitro-compounds of the fatty series, 131.
Norton, new platinic chloride, 312.
Norton, W. A., molecular and cosmical physics, 8.
Nova Scotian Ins. of Nat. Sci., publications noticed, 72.

O

OBITUARY—
Delaunay, 332.
Gray, G. R., 160.
Frazer, John F., 424.
Perry, John B., 424.
Smith, Andrew, 332.
Stimpson, W., 159.
Swift, Robert, 160.
Observatory, Cordoba, *Gould*, 475.
Harvard, Annals, noticed, 242.
astronomical views issued by, 243, 497,
Melbourne, observations, noticed, 158.
object-glass of equatorial stolen, 327.
U. S. Naval observations, noticed, 156.
Ohm's law from a geometrical point of view, *Trowbridge*, 115.
Ozone, production of, *Wright*, 26.
action on vulcanized caoutchouc, *Wright*, 29.

P

Packard, A. S., embryological studies, noticed, 158.
Packard and Putnam, life in Mammoth Cave, noticed, 149.

Parallels, Euclid's doctrine of, *Twining*, 333.
Perrey, A., work on earthquakes, noticed, 80.
Peters, C. H. F., new planets, 244, 281.
elements of planets, 400, 495.
Petroleum in San Domingo, 158.
Phenol-colors, 62.
Phosphorus and platinum, compounds containing, 227.
Physics, molecular and cosmical, *Norton*, 8.
Planets, elements of, *Peters*, 400, 495.
Planets, four outer, on certain relations between the mean motions of the perihelia of, *Kirkwood*, 225, 327.
Planets, new, *Peters*, 244, 281.
Plateau, T., experiment in reference to vapor-vescicles, 129.
Platinic chloride, new, 312.
Platinum bases, ammoniacal, 226.
Pompeii, 331.
Popoff, oxidation of ketones, 61.
Pouchet, G., cause of the blue and violet chatoyant colors in fishes, 78.
Pressure, barometric, effect of change of, on human beings, 248.
Prestwick, J., solvent action of water, 412.
correlation of the Coal-measures of Britain, France and Belgium, 413.
Priority, reply to a note on question of, *Hall*, 105; rejoinder, *Billings*, 399.
Prism, erecting, *Zentmayer*, 64.
Pseudomorphs of serpentine, *Rand*, 71.
Pyrometer, acoustic, *Mayer*, 425.

R

Rainier, Mt., height of, 156.
Rand, T. D., pseudomorphs of serpentine, 71.
hisingerite from Lancaster Co., Pa., 72.
Rath, vom, mineralogical investigations of, 72.
Reade, T. M., work on Post-glacial period, noticed, 241.
Refraction in Iceland spar, 404.
Reye, T., work on whirlwinds, etc., noticed, 80.
Ridgway, R., relation between color and geographical distribution in birds, 454.
Riviere, E., fossil man in Italy, noticed, 241.
Rockwood, C. G., recent earthquakes, 1.
Owen's Valley earthquake, 316.
Rood, O. N., discharge of Leyden jar connected with induction coil, 249, 371.
Rose, G., meteorite of Ibbenbühren, 78.
Rue, de la, Zollner's theory of comets, 324.
Rutherfurd, L. M., stability of collodion film, 430.

S

Salet, light emitted by the vapor of iodine, 59.
Schützenberger, compounds containing phosphorus and platinum, 227.
Seue, C. de, névé of Justedal and its glaciers, 134.
Shelton, J., beavers and beaver-dams, 422.
Shepard, C. U., corundum region of North Carolina and Georgia, 109, 175.
Silver, fluoride of, 60.
Smyth, C. Piazzi, spectra of star-shine, etc., 245.
Soil analyses, their utility, *Hilgard*, 434.
Sound, measuring wave-lengths, in gases, *Mayer*, 425.
on a paper of Radau's on, *Mayer*, 198.
phases of vibration in the air, etc., *Mayer*, 387.
Spectra, absorption, of selenium, etc., 59.
of star-shine, etc., 245.
Spectroscopic Soc. of Italy, memoirs, noticed, 157.
Spectrum, distribution of heat in, *Draper*, 161.
of aurora, *Holden*, 423.
lightning, *Holden*, 474.
solar atmosphere, *Young*, 356.
Star Castor, double, 77.
Steam boilers, evaporative efficiency of, *Trowbridge*, 81.
Stevens, R. P., glacial phenomena in the vicinity of New York City, 88.
Stokes, G. G., refraction in Iceland spar, 404.
Sulphur, estimation of, in coal, etc., *Mixter*, 90.
Sunlight, chemical efficiency of, 401.
Sun's chromosphere, magnesium in, 244.
Sun, temperature of surface, *Ericsson*, 152.

T

Taylor, J. W., separation of yttria and ceria from zirconia and iron, 230.
Teclu, N., composition of oligoclase, 146.
Thomas, C., list of elevations and distances west of the Mississippi, noticed, 246.
Tidal wave at Sandwich Is., 331.
Time signals, electric, *Langley*, 377.
Trowbridge, J., electrical condition of gas flames, 4.
Ohm's law considered from a geometrical point of view, 115.
Trowbridge, W. P., evaporative efficiency of steam boilers, 81.

Trowbridge, W. P., Tables and diagrams relating to engines and boilers, noticed, 496.
Tschermak, meteorites of India, 78.
Tuckerman, E., Genera Lichenum, noticed, 420.
Twining. A. C., Euclid's doctrine of parallels demonstrated, 333.

U

Uranium, light of phosphorescent compounds of, 486.

V

Vapor vesicles, *Plateau*, 129.
Venus, papers relating to transit of, noticed, 330.
Vesuvius, composition of vapors from, 147.
Vogel, spectrum of aurora borealis, 487.
Volcanic energy, *Mallet*, 409.
Volcano, eruption of Mauna Loa, 331, 406.

W

Wagner, R., Hand-book of chemical technology, noticed, 422.
Wartman, E., prismatic bows on Lake Geneva, 79.
Water not an electrolyte, 310.
solvent action of, 412.
Weber, H. F., specific heat of carbon, 228.
Websky, transparent garnet from Silesia, 147.
Whitney, J. D., Owen's Valley earthquake, 316.
Wilson, double star Castor, 77.
Winchell, N. H., surface geology of northwestern Ohio, 321.
Woodward, H., monograph of the Merostomata, noticed, 322.
Wright, A. W., apparatus for the production of ozone, 26.
action of ozone upon vulcanized caoutchouc, 29.
Wurtz, an aldehyd-alcohol, 132.
Wurtz and *Vogt*, formation of chloral, 312.

Y

Young, C. A., catalogue of bright lines in spectrum of the atmosphere, 356.
Yttria and ceria, separation from zirconia and iron, 230.

Z

Zentmayer, J., new erecting prism, 64.
ZOOLOGY—
Bass culture in England, 332.
Beavers and beaver dams, *Shelton*, 422.
Birds, relation between color and geographical distribution in, *Ridgway*, 454.
Conchology, Journal of, 80.
Coral reefs, rate of growth, *Dana*, 143.
Fishes, cause of color in, 78.
Journal of, noticed, 77.
Monkeys, intelligence in, *Cope*, 174.
Myriapods, new North American, *Harger*, 117.
Serpents, sea-, 332.
Snake, curious habit of, *Cope*, 148.
Sponges, reproduction of, 249.
Terebratulina, oviducts and embryology of, *Morse*, 126.
See further under GEOLOGY.

ERRATA.

Vol. ii, p. 180, *for* "(near Chatham Four-corners)" *read* "(near Galesville, Washington Co., N. Y.)."

Vol. iv, page 53, 8th line from top, *for* "particularly" *read* "partially."
" " 123, last line, *for* "*Mastodon anceps*," *read* "*Tinoceras anceps*."
" " 185, line 18 from top, for *district* read *distinct*.
" " 242, " 10 " " for *tilted* read *silted*.
" " 323, 20 lines from bottom, for "very small" read "narrow."
" " " 13 lines from bottom, for "but five" read "six."
" " 370, 19 lines from foot, before "Trenton," insert "Quebec."
" " 389, line 10 from top, for *ventral* read *nodal*.
" " " " 12 " for UT_8 read UT_3.
" " 451, " 9 " for 500 read 300.